MISCELLANEOUS.

On the Death of the common Hive-Bee, supposed to be occasioned by a parasitic Fungus. By the Rev. H. H. Higgins, M.A.

On the 12th of March last, Timpron Martin, Esq., of Liverpool, communicated to me some circumstances respecting the death of a hive of bees in his possession, which induced me to request from him a full statement of particulars. Mr. Martin gave me the following account:—

"In October last I had three hives of bees, which I received into my house. Each doorway was closed, and the hive placed upon a piece of calico; the corners were brought over the top, leaving a loop by which the hive was suspended from the ceiling. The hives were taken down about the 14th of March, and two were healthy, but all the bees in the third were dead. There was a gallon of bees. The two hives containing live bees were much smaller, but in each there were dead ones. Under whatever circumstances you preserve bees through the winter, dead ones are found at the bottom in the spring. The room, an attic, was dry, and I had preserved the same hives in the same way during the winter of 1856. In what I may call the dead hive, there was abundance of honey when it was opened, and it is clear that its inmates did not die from want. It is not a frequent occurrence for bees so to die, but I have known another instance. In that case, the hive was left out in the ordinary way, and possibly cold was the cause of death. I think it probable that my bees died about a month before the 14th of March, merely from the circumstance that some one remarked about that time that there was no noise in the hive. They might have died earlier, but there were certainly live bees in the hive in January. I understand there was an appearance of mould on some of the comb. There was ample ventilation, I think; indeed, as the bees were suspended, they had more air than through the summer, when placed on a stand."

When the occurrence was first made known to me, I suggested that the bees might probably have died from the growth of a fungus, and requested that some of the dead bees might be sent for examination. They were transmitted to me in a very dry state, and a careful inspection with a lens afforded no indication of vegetable growth. I then broke up a specimen, and examined the portions under a compound microscope, using a Nachet, No. 4. The head and thorax were clean; but on a portion of the sternum were innumerable very minute, linear, slightly curved bodies, showing the well-known oscillating or swarming motion. Notwithstanding the agreement of these minute bodies with the characters of the genus *Bacterium* of the *Vibrionia*, I regarded them as spermatia, having frequently seen others indistinguishable from them, under circumstances inconsistent with the presence of Confervæ, as in the interior of the immature peridia and sporangia of Fungals.

In the specimen first examined there were no other indications of the growth of any parasite; but from the interior of the abdomen of a second bee I obtained an abundance of well-defined globular bodies, resembling the spores of a fungus, ·00012 to ·00016 inch in dia-

meter. Three out of four specimens subsequently examined contained within the abdomen similar sporcs. No traces of mycelium were visible; the plants had come to maturity, fruited, and withered away, leaving only the spores.

The chief question then remaining to be solved was as to the time when the spores were developed, whether before or after the death of the bees. In order, if possible, to determine this, I placed four of the dead bees in circumstances favourable for the germination of the spores, and in about ten days I submitted them again to examination. They were covered with mould, consisting chiefly of a species of *Mucor*, and one also of *Botrytis* or *Botryosporium*. These fungi were clearly extraneous, covering indifferently all parts of the insects, and spreading on the wood on which they were lying. On the abdomen of all the specimens, and on the clypeus of one of them, grew a fungus wholly unlike the surrounding mould. It was white and very short, and apparently consisted entirely of spores, arranged in a moniliform manner, like the filaments of a stemless *Penicillium*. These spores resembled those found in the abdomen of the bees, and, I think, proceeded from them. The filaments were most numerous at the junction of the segments. The spores did not, I think, resemble the globules in *Sporendonema muscæ* of the English flora, neither were they apparently enclosed.

The Rev. M. J. Berkeley, to whom I sent some of the bees, found, by scraping the interior of the abdomen with a lancet, very minute, curved, linear bodies, which he compares to Vibrios. He also found, mixed with them, globular bodies, but no visible stratum of mould.

From the peculiar position of the spores within the abdomen of the bees, and from the growth of a fungus from them unlike any of our common forms of *Mucedines*, I think it probable that the death of the bees was occasioned by the presence of a parasitic fungus.—*Proc. Lit. and Phil. Soc. of Liverpool*, Session 1857–58.

On a new species of Toucan. By Mr. J. Gould.

Andigena spilorhynchus.

Crown of the head and back of the neck glossy black; back, wing-coverts, and margins of the primaries dull sienna-brown; secondaries bluish brown; upper tail-coverts blue strongly tinged with green; tail slaty blue tinged with green, the four central feathers largely tipped with chestnut; band across the rump sulphur-yellow; throat and cheeks white, blending into the light blue of the breast and abdomen; thighs rich chestnut; under tail-coverts blood-red; feet greenish blue, with a lilac tinge on their under surface; bill black, with a mark of obscure brownish red at the base of the upper mandible, which, when viewed in front, much resembles the letter W, this colour advancing for a short distance on each side of the culmen and extending down the sides of the base.

Total length, 18 inches; bill, $3\frac{3}{4}$; wing, 7; tail, $7\frac{1}{2}$; tarsi, $1\frac{3}{4}$.

Hab. Forest of Beza, on the eastern side of the Cordillera in Ecuador.—*Proc. Zool. Soc.* March 23, 1858.